Panasonic

Technical Guide

2010 Panasonic 3D Plasma TV (13th Generation)

Applies to models:

3D FULL HD™

TC-P50VT20
TC-P54VT20
TC-P50VT25
TC-P54VT25
TC-P58VT25
TC-P65VT25

Panasonic Service and Technology Company
National Training

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⚠ **Warning**
This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Introduction

The Panasonic 3D Plasma TV uses what's called "Frame Sequential Method". By using this method, the TV outputs alternating imagery at 60 frames per second to each eye. The brain then combines the images and interprets them as 3D.
The PDP high-speed light emission technology utilized to display high-picture quality full HD video images for the left and right eyes in frame sequential is unique to Panasonic.

The Panasonic 3D PDP utilizes new phosphor technology for "real deep black and unsaturated brightness," and employ proprietary 3D drive technology circuitry to minimize crosstalk between alternating images.

Features/Specifications

Series Line up

SERIES	MODELS					
	42"	46"	50"	54"	58"	65"
VT SERIES (FHD Premium 3D)			TC-P50VT25 TC-P50VT20	TC-P54VT25	TC-P58VT25	TC-P65VT25

Differences between the VT20 and VT25 models

1. **The VT25 Series models offer ISFccc (calibrated with an RS232C jack) and Studio reference mode, and Pro Setting.**
   ISFccc is a protocol used to help professional (*BB ISF)* calibrators to adjust the TV for a perfect picture.
2. **RS232C Jack (VT25)** for custom installations.
3. **The bezel color of the VT20 is gunmetal silver/grey while.**

   The bezel color of the VT25 Series models is a deep brown metallic.

New Features

	VT20	VT25
High Picture Quality	**FHD 3D Dual Scan** *NEW* **Short Stroke Phosphor** *NEW* **THX Certified** **Moving Picture 1080 Lines** **600Hz Sub-field Drive** **Infinite Black Plus (Native CR > 2 Mil:1)** *NEW*	
Smart Networking	**Viera Cast IPTV** **Wi-Fi Ready (USB)x2** **VIERA Image Viewer (Movie & Photo)** **Viera Link** **4 HDMI Ports** *NEW*	
		RS232
Stylish Design	**Metallic** *NEW*	
Environmentally Friendly	**Energy Saving (Louver Filter)** **Mercury & Lead Free + 100,000 hrs + Eco Mode**	

Features

Full HD 3D Technology
For a true Full 1080p 3D image, Panasonic's VT25 Series features new, faster screen phosphors (short-stroke) which, when coupled with the VIERA VT25's 600Hz sub-field drive, outputs alternating imagery at 60 frames per second to each eye. Working in unison with the required Active Shutter Eyewear, the human brain then combines the images and interprets them as a Full HD 3D image for the highest possible realistic visual experience; in effect mimicking what the human eye sees in real life.

Active Shutter Eyewear
All Panasonic VIERA VT25 Series models come with one pair of Panasonic 3D Active Shutter Eyewear (TY-EW3D10U). Additional pairs of Panasonic 3D Eyewear are available at retail with an SRP of $149.95.

Infinite Black Pro Panel
A new phosphor technology that produces deep blacks (5,000,000:1 native contrast)2 and vivid images with minimal reflection.

THX Certified Display
Ensures that every Panasonic Full HD 3D TV displays motion pictures and television content with exactly the quality and color palette that the director intended.

VIERA CAST WiFi with Skype Capability
Panasonic's innovative Internet programming package, gives viewers the ability to access feature films plus information and communication offerings including Amazon Video on Demand™, Bloomberg News, Fox Sports, Netflix™, and Skype™ on Your VIERA TV3, among others.
Access to a broadband Internet connection is required. Panasonic's Communication Camera (TY-CC10W) is required for Skype video functionality and sold separately

All Panasonic VIERA VT25 Series models also feature 600HZ Sub-field Drive, 1080p Lines Moving Picture Resolution, VIERA Image ViewerTM, VIERA LinkTM Connectivity with Network Cameras, 24p Cinematic Playback, two USB Ports, PC Input, and are ENERGY STAR 4.0 compliant.

Specifications

		VT SERIES
Sound	Surround	Y
	Sound Control	Y
	BBE	Y
	Balance Control	Y
	Lip Sync Improvement	Y
Terminal Input	AV1 Type (Position)	RCA/S (Rear)
	AV2 Type (Position)	RCA (Side)
	Component1 Type (Position)	RCA (Rear)
	Component2 Type (Position)	RCA (Rear)
	HDMI1 Position	Rear
	HDMI2 Position	Rear
	HDMI3 Position	Rear
	HDMI4 Position	Side
	PC Input	1
Terminal Output	Digital Audio Out	Y
Network	Ethernet	1

		VT SERIES
Main Specification	Resolution	1920X1080
	Contrast (Native)	Infinite:1
	Gradation	6144
	Filter	Louver (Direct filter)
	Remote	w/ Viera Cast
	THX	Y
Picture	Deep Color	Y
	X.V. Color	Y
	Game Mode	Y
	Motion Reality	1080 lines

		VT SERIES
Card I/F	SD Card Slot	Y
	SD Card LED Color	Blue
	SD Function	Movie & Photo
Other I/F	USB (Wi-Fi Ready)	2
	RS-232C	VT25 Only
Function	DLNA	-
	IPTV	Viera Cast

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FHD 3D Panasonic Consumer Products

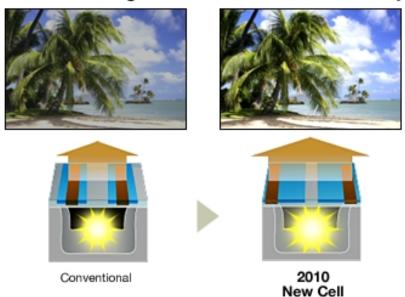| 3D Plasma TV	BD Player	Home Theater
TC-P40VT20	DMP-BDT300PP	SC-ZT2
TC-P50VT25	DMP-BDT350PP	
TC-P54VT25	DMP-BDT100PP	
TC-P58VT25		
TC-P65VT25		

New Plasma Display Panel

The new panel used on the 2010 3D plasma TVs has 3 areas of improvement:

1. **<u>Enlarge discharge area.</u>**

2. **<u>New filter.</u>**

3. **<u>Reduced pre-discharge.</u>**

1 - Enlarged Discharge Area (improves brightness and contrast with less power consumption)
The new cell structure, materials, and phosphors made it possible to enlarge the discharge area of each cell. This increases both brightness and contrast, so you enjoy a bright, vibrant picture while using less energy.

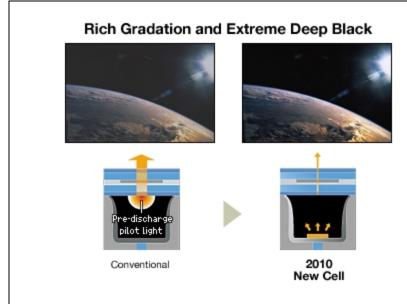**High-Contrast Images with Lower Power Consumption**

Conventional

2010
New Cell
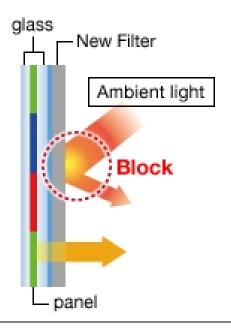
New Plasma Display Panel

2 - A New Filter
(It blocks ambient light to increase contrast and brightness)

A newly developed film minimizes reflection from ambient lighting and increases contrast. It also improves light transmittance, which boosts brightness. The result is reproduction of images that look breathtakingly beautiful in any viewing environment

Rich Gradation and Extreme Deep Black

3 - Reduced Pre-Discharge
(Reduces grey and enhances black gradation)

To minimize light leakage, we found a way to reduce the level of pre-discharge required for plasma light emission. This helps achieve deeper, richer blacks that give images exceptional depth and presence

THX

THX reproduces film images exactly as the film's creators intended them.

The aim is to recreate the audio and visual ambience that filmmakers intended.

To receive THX certification, TVs undergo stringent tests to determine:

- If the exact same brightness and color are displayed at all screen locations.

- If black levels satisfy standard criteria.

Panasonic 3D Plasma TVs meets the high standards set by the THX Certified Display Program.

Evaluation Points for THX® Certified Displays

Picture Quality		Signal Processing
• Luminance	• Gamma	• Scaling (video signal processing)
• Contrast	• Uniformity	• Deinterlacing
• Colour gamut	• Max resolution	• Motion/video conversion

Contrast Ratio

Note: Native Contrast is expressed as a ratio of the minimum of luminance levels of blacks and the maximum of luminance levels of whites that are displayed and measured at the same time on the same screen in a dark room on a plasma panel module.

Panasonic's Native Contrast measurement expresses the maximum contrast ratio of the plasma panel measured at the time of manufacture and does not express a contrast ratio measured during ordinary viewing conditions by a consumer.

For 2010 plasma television models, Panasonic measures Native Contrast in a Dynamic mode using a static white rectangular pattern with 4% area size. This allows consumers to compare more easily the Native Contrast ratios reported for Panasonic plasma televisions with the Dynamic Contrast ratios reported by many manufacturers of LCD televisions.
Depending on the model, Native Contrast of the panel has been measured as either 5,000,000:1 or 2,000,000:1. Unlike measurements taken for previous models, Pre-Discharges do not occur for the images used in the 2010 model measurements, so the results should not be compared to contrast ratios reported for earlier year Panasonic models.

Most manufacturers use the Dynamic Contrast methodology in measuring contrast ratios for LCD televisions. This methodology, unlike the Panasonic Native Contrast ratio measurement for plasma televisions, compares the maximum luminance levels on full white signal in one picture with the minimum luminance levels on full black signal in another picture.

Precautions

■ **View the screen at a distance at least 3 times the height of the screen.**
   Recommended distance:
      For a 50-inch TV : 1.9 m **(6.23359')** or more
      For a 54-inch TV : 2.0 m **(6.56167')**or more

■ **When watching 3D movies, take an appropriate length break after watching a movie.**

■ **When watching 3D content on interactive devices such as 3D games or computers,**
   take an appropriate length break after using for 30 - 60 minutes.

■ **As a guide, 3D Eyewear should not be used by children younger than 5 - 6 years old.**
   As it is difficult to judge younger children's reactions to fatigue or discomfort, you may not prevent them
   from suddenly getting sick.
   When this product is being used by a child, the parent or guardian should check to ensure that the child's
   eyes are not becoming tired.

■ **When using the 3D Eyewear, do not place breakable objects near the user.**
   The user may mistake the 3D objects they are viewing as real objects causing him to move suddenly.
   This may cause damage to surrounding objects leading to injury.

Can Everybody See 3D?

No. There's a small percentage of human (5%~10% of Americans) that lack the ability to properly see different images for each eye. This condition is called "Stereo Blindness".

3D Technology

3D Display Formats (Methods)

There are a few methods used to separate the left and right eye images on a 3D display:

Frame Sequential, Side by Side, Top and Bottom, Checker Pattern (Field Sequential), Line By Line

Frame Sequential ← Supported By Panasonic 3D Plasma TV

In the frame sequential method, images for each eye are alternately reproduced in its full resolution. This means a separate 1920 x 1080 Full HD image is sent to each of eye, enabling the viewers to fully immerse themselves in the 3D landscape presented.
Frame sequential is what the Blu-ray spec and active shutter TVs use.

Side By Side ← Supported By Panasonic 3D Plasma TV

broadcasts in which 2D and 3D feeds are run alongside each other to ensure a seamless simulcast to the receiver. If signal is not processed as 3D, the image on the TV will look like 2 pictures side by side.

Used by Direct TV ← Supported By Panasonic 3D Plasma TV

Top and Bottom
Normal video frame actually has 2 frames, one on top a

Manual setting is necessary. Blu-ray recorder do not support this format.

Checker Pattern (Field Sequential)
In the field sequential method, the screen is divided in clusters of pixels. Because the images are laid out in a checkered pattern, the image data that reaches each eye only has only half the number of pixels than that of a Full HD image thus resulting in a lower quality picture.
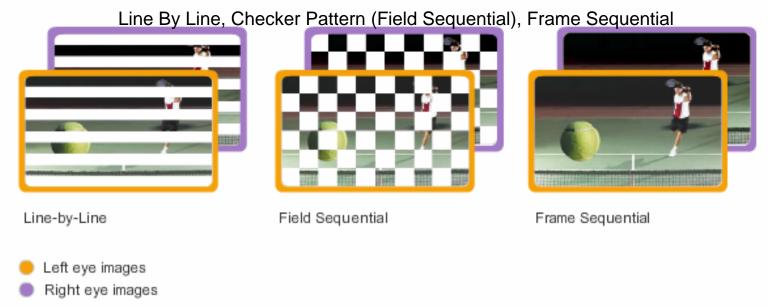
Line By Line
In the line-by-line method, the screen's lines are divided into even and odd lines by a polarizer filter. This encodes the light in a plane that the odd lines can be only perceived by the left eye and the even only by the right eye. Because the data for both eyes is displayed on one image, the vertical resolution is only 50 % of that of frame sequential technology, resulting in a lower quality picture. As well: The polarizer filter with the polarizer glasses have limitations of its viewing angle – when sitting higher or lower than the screen so called ghosting will appear.

3D Display Formats (Methods)

Item	3D Multiple Broadcasting			Checker Pattern Also Called Field Sequential	Line by Line
	(FS) Frame Sequential	Side by Side	Top & Bottom (T&B)		
Input	HDMI Ver. 1.4	HDMI Ver/1.4/ HDMI Ver.1.3 under	Under HDMI Ver.1.3	Digital signal from PC etc.	HDMI Ver.1.4
Image				L ☐ R ☐	
Support Situation	○	○	○	×	×
Setting method	HDMI Ver1.4 : Auto	HDMI Ver1.4 : Auto Other: User manual setting	User manual setting		
Remarks	BD contents use this FS format.		BD-recorder cannot accept this T&B format.	Format used for PC etc.	

Only HDMI Ver. 1.4 can recognize 3D signal.
3D signal is only for the digital input.   (PC and an external analog input, etc. do not accept 3D signal.)

3D Display Formats (Methods)

Line By Line, Checker Pattern (Field Sequential), Frame Sequential

Line-by-Line   Field Sequential   Frame Sequential

🟠 Left eye images
🟣 Right eye images

A sequential 3D TV can display sequential 3D, this means the TV converts it.

Blu-ray outputs the video at 1080p 24 frames per second, per eye; or 48 frames per second. This signal goes to the TV but the glasses are what ensures each eye sees the correct image.

The side by side systems, a single 1080p frame that holds both the right and left eye's images is sent at 24 frames per second. The TV receives this signal, splits it into two frames, displays them sequentially and then stretches them out.

This is not as good as Blu-ray, but it uses way less bandwidth and makes it so that the TV Station (Like DirecTV) can just release a firmware update instead of replacing all the set-top boxes. It is expected that cable companies will use the same technique.
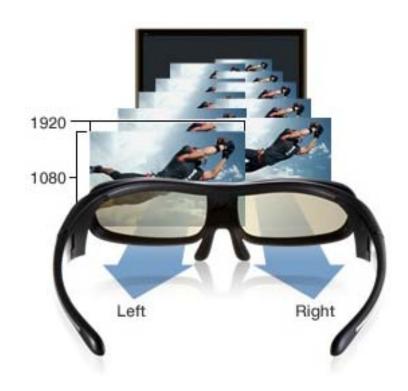
Auto-Stereoscopic TV is the future. The 3D image is created without the need for glasses, but this is 10 to 15 years away.

Frame Sequential Method

Frame Sequential Method

Panasonic uses full-HD sequential playback to achieve a level of reality that far exceeds conventional 3D systems. Called the Frame Sequential Method, it's the same method that is used in Hollywood's 3D films. It reflects our commitment to 3D imaging detail. Separate images recorded in 1920 x 1080-pixel resolution for both the left and right eyes are alternately displayed at the ultra-high speed of 120 frames per second.* Viewing them with high-precision 3D Eyewear produces 3D images in full-HD quality.
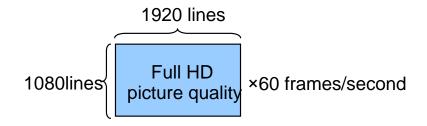
Note: The frame rate varies depending on the 3D image signal being reproduced. For example, 3D images are reproduced at 120 fps (frames per second) for a 60Hz input signal, and 100 fps for a 50Hz input signal.
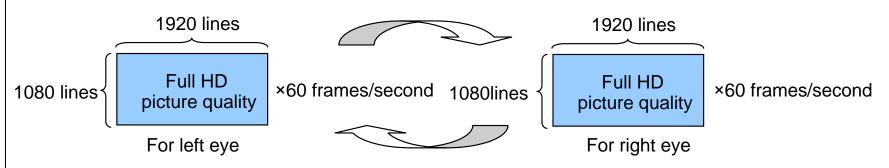
FULL HD 3D Video Picture Format

FULL HD 2D Video Picture

FULL HD Video = Video of 60 frames of about 2 million pixels

1920 lines

1080lines Full HD picture quality ×60 frames/second

FULL HD 3D Video Picture

FULL HD 3D Video = Video of 60 frames for right eye and left eye (total 120 frames) of FULL HD Video (1920 x 1080) are alternately transmitted per second.

1920 lines

1080 lines Full HD picture quality ×60 frames/second

For left eye

1920 lines

1080lines Full HD picture quality ×60 frames/second

For right eye

FULL HD 3D Video : Two times of information data of FULL HD video pictures must be transmitted, so when connecting home theater system between VIERA and DIGA, use 3D home theater system.

 Note: FULL HD 3D Video signal have double the information data of 2D video signal.

Eyewear (EW3D10U)

EW3D10 Full HD 3D Eye-ware
High Precision shutter control sends clear images to each eye.
Highly precise control completely closes the shutters for both eyes at the instant that the images change for the left and right eyes. This masks unwanted afterimages to enable clear and comfortable 3D viewing.

Features:

Adjustable, durable frame
The Eyewear can be easily adjusted to fit various face shapes and sizes, from children to adults.

Designed for use together with ordinary glasses
The 3D Eyewear can also be comfortably worn right over ordinary prescription glasses.

Power on/off switch
An Auto Power Off function automatically turns the glasses off if they are placed in a location outside the viewing range or IR receiving distance **(3.2m = 10.5')** for 5 minutes, even if the TV remains turned on.

3D Eyewear case included
The 3D TV comes with 1 pair of 3D Eyewear necessary to view the 3D content. Additional 3D Eyewear may be purchased separately.

Warning: In the event that you experience dizziness, nausea, or other discomfort while viewing 3D images discontinue use and rest your eyes.
Parents/guardians should monitor children's viewing habits to avoid their prolonged use without rest periods.
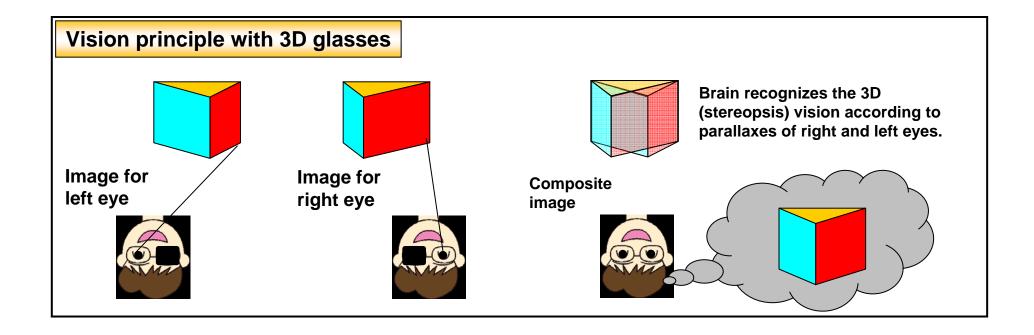Use only the 3D Eyewear recommended for this TV.

3D Eyewear Specification

Specifications	
Lens Type	Liquid Crystal Shutter; Frame sequential type
Batteries/ (duration)	Coin-shaped lithium battery CR2032 / (Approx. 75 hours in a row)
Dimensions (W x H x D)	177 x 46 x 174 mm (7.0" x 1.9" x 6.9")
Power Supply	DC 3 V
Materials	Main body: Resin; Lens section: Liquid crystal glass
Weight (including batteries)	Approx. 63 g (2.2 ozs.)
Viewing Range*	Transmitter for 3D Eyewear / Within 3.2 m (10' 5") from front surface (Within 35-degree horizontal, 20-degree vertical)
Usage Temperature Range	0°C - 40°C (32°F - 104°F)
NOTE	The location of the 3D Eyewear transmitter differs depending on the model of television. / There are differences in the viewing range of the 3D Eyewear among individuals.

Infra-red receiver

Receives infra-red signals from the television.
The liquid crystal shutter open/close timing is controlled
by receiving infra-red signals from the television, which
provide 3D expression of the images.

Vision principle with 3D glasses

Vision principle with 3D glasses

Image for left eye

Image for right eye

Composite image

Brain recognizes the 3D (stereopsis) vision according to parallaxes of right and left eyes.

Difference Between the <u>Passive Plastic Glasses With Polarized Lenses</u> Used at the Movies and The <u>Active Shutter System Glasses Used with 3D TVs</u>

With active shutter glasses, crosstalk is eliminated easier than passive glasses.

Crosstalk is a phenomenon where an image intended for one eye is seen by the other, causing ghost images to appear.

With the active shutter glasses, both eyes can be closed off for a split second between each frame. This reduces ghosting or crosstalk.

Passive glasses are used with TVs where a polarized filter in the TV has to switch directions for each eye.

Procedures To Check The 3D Eyewear

Determining if a the 3D eyewear is working or not can be easily done if another set of working eyewear is available.

When another set of eyewear is not available, perform the following tests to determine if the glasses are OK:

1. **Battery voltage check**
2. **Shutter operation check**

1 - Battery voltage check
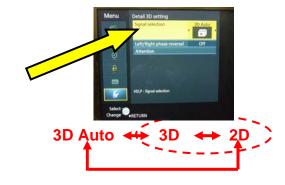
- Normal charge **(2.5V to 3V)** is indicated when the power switch is turned on and the <u>Power LED turns on for approximately 2 seconds and then it goes off.</u>

- <u>The Power LED blinks 3 times</u> when the power is turned off.

- A low charge is indicated when the <u>Power LED blinks for 5 times</u> instead of just once after the power is turned on. The voltage at this point is between **2V to 2.5V**.
  Note: The IR receiving distance is shortened when the power-supply voltage decreases

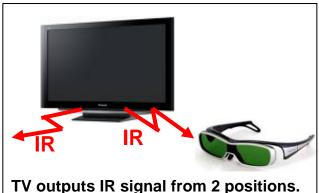- When the voltage drops below **2V**, the power doesn't turn on (Replace the battery).

Procedures To Check The 3D Eyewear
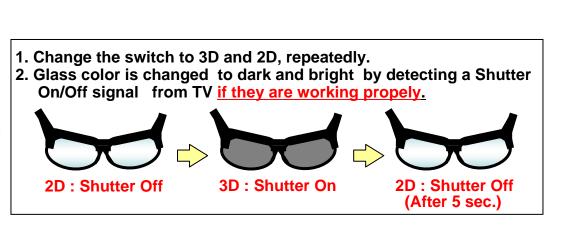
2 - Shutter operation check

Check shutter open/close operation by changing 2D/3D select switch on the user menu.

The liquid crystal shutter open/close timing is controlled by receiving IR signals from the TV, which provide 3D expression of the images.

3D Auto ↔ 3D ↔ 2D

TV outputs IR signal from 2 positions. Even if one IR signal is blocked, the 3D eyewear will receive the other IR signal.

IR   IR

1. **Change the switch to 3D and 2D, repeatedly.**
2. **Glass color is changed to dark and bright by detecting a Shutter On/Off signal from TV <u>if they are working propely</u>.**

2D : Shutter Off   **3D : Shutter On**   **2D : Shutter Off (After 5 sec.)**

How to check IR signal from TV set

Set the 3D/2D select switch on the user menu to 3D to confirm the IR output signal from the TV by using Mobile Phone's Camera.

Note: This will not work with cameras with IR filters

3D Auto ⟷ 3D ⟷ 2D

2D : IR Output OFF
3D : IR Output ON

There are total six IR output LED.

Cell Phone's camera

2D : IR Output OFF

2D → 3D
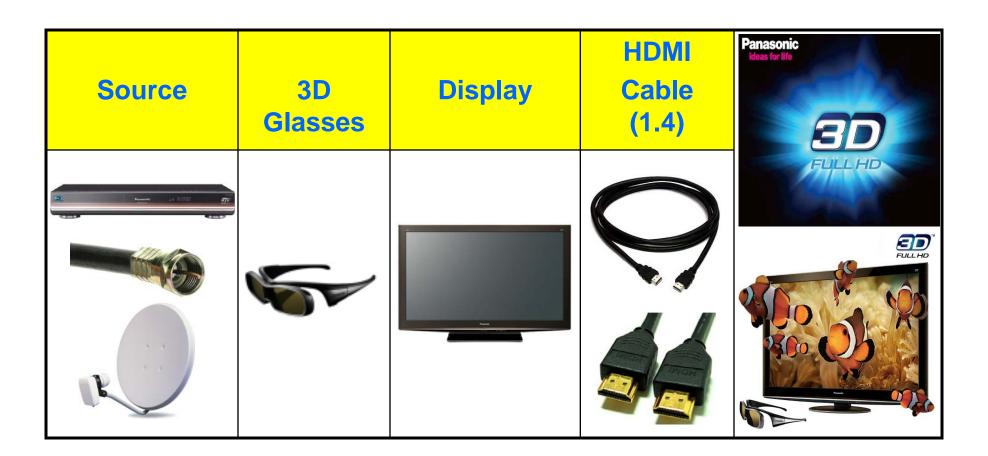
3D : IR Output ON

LED are indicated if TV is working propery.

3D Source and 3D Format Settings

Basic Components

Source	3D Glasses	Display	HDMI Cable (1.4)	

Only the HDMI inputs are compatible with the 3D mode.

3D Sources

Digital or HD service subscription and a direct cable connection or an HD STB (Set-Top-Box) are required.

• **If a STB is used, an HDMI connection between the cable box and the TV is required.**

• **The TV or STB needs to be tuned to the channel with the 3D broadcast.**

• **Stereoscopic 3D glasses are required.**

Customers should contact their cable or satellite service providers to see if they are subscribed to a service which provides 3D content, or check their local listings for channels this will be carried on for off air broadcasts.

The issue is that there may not be a "**3D Content Flag**" embedded in the signal which would cause the TV to automatically change to the correct **3D Input Format**, so customer may have to make this change in the TV's menu manually. (They may need to manually change this setting until the EDID/VSI information that will allow our TVs to automatically switch to 3D mode is included in the broadcast).

3D Settings Menu

There are two ways to enter the 3D menu to adjust the 3D settings:

1) By pressing the "VIERA Tools" on the remote control

   Press remote "VIERA Tools" button, then select "3D"

2) By pressing the "Menu" button on the remote control

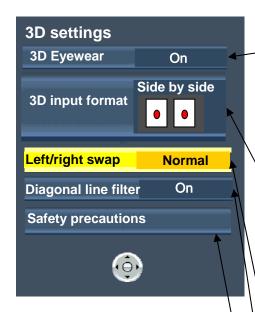   **Press remote "MENU" button, then select "Setup" > "3D settings"**

Note: Both are actually same menu as next page. However, from VIERA Tools, the message below will be displayed except when TV(ANT In = Antenna) or HDMI input is selected instead of 3D settings.

3D

Enjoy an entirely new viewing experience with Panasonic 3D.
Display 3D content via an HDMI-connected device or 3D DTV signals
via the Antenna input.

3D Settings Menu

3D settings

3D Eyewear — On

3D input format — Side by side

Left/right swap — Normal

Diagonal line filter — On

Safety precautions

Option	Function
On	Default option. Select when Eyewear (Glasses) is used for watching
Off	Select when Eyewear (Glasses) is not used, including even when 3D signal is received. (Because customer cannot watch 3D images without the glasses)

For details, see next page.

Option	Function
Auto	Default option. Select 3D/2D automatically regardless of input format.
Side by side	Select 3D manually when input format is Side by side (such as DirecTV).
Top and bottom	Select 3D manually when input format is Top and bottom
Native	Display the input signals as is on the screen. (For customers service.)
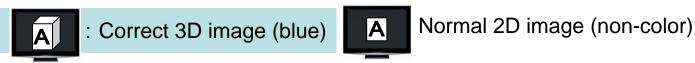
Because TV cannot detect left/right phase in some 3D signal formats, this option is used when customers feel strange in depth perception.

Option	Function
Normal	Default option. To set Left/Right phase straight.
Swapped	To set Left/Right phase reversed.

Option	Function
On	Processing input video as "Quincunx matrix" signal, only when Side-By-Side or Top-And-Bottom is received.
Off	Default option. Processing input video as "Horizontal sub sampling" signal, only when Side-By-Side or Top-And-Bottom is received.

To display Safety Precautions message

"3D input format" Matrix Between Menu and Actual

 : Correct 3D image (blue)   Normal 2D image (non-color)

Menu "3D Eyewear"	On				Off			
Actual Input format \ Menu "3D Input format"	Auto	Side by side	Top and bottom	Native	Auto	Side by side	Top and bottom	Native
3D Frame Sequential (DIGA)	(spanning Auto–Native)				(spanning Auto–Native)			
3D Side by side (DirecTV)	*1				*1			
3D Top and bottom	*2				*2			*2
2D								

*1 Displays 3D image only when "Side by Side" ID is detected in the signal
   (Devices compliant with HDMI v1.4). If ID is not detected, image is displayed as "Native" image.
*2 Displays 3D image only when "Top and Bottom" ID is detected in signal
   (Devices compliant with HDMI v1.4a). If ID is not detected, image is displayed as "Native" image.

How to change from 2D to 3D

If you see something like this you need to change the TV's "3D input format" to "Side by Side"

How to change from 2D to 3D

If you see something like this you need to change the TV's "3D input format" to "Top and Bottom"

How to change from 2D to 3D

The best way to do this is on the remote press the "VIERA TOOLS" button on the remote

How to change from 2D to 3D

After you press the "VIERA TOOLS" button this screen will come up

Press the "OK" when the "3D" option is highlighted

How to change from 2D to 3D
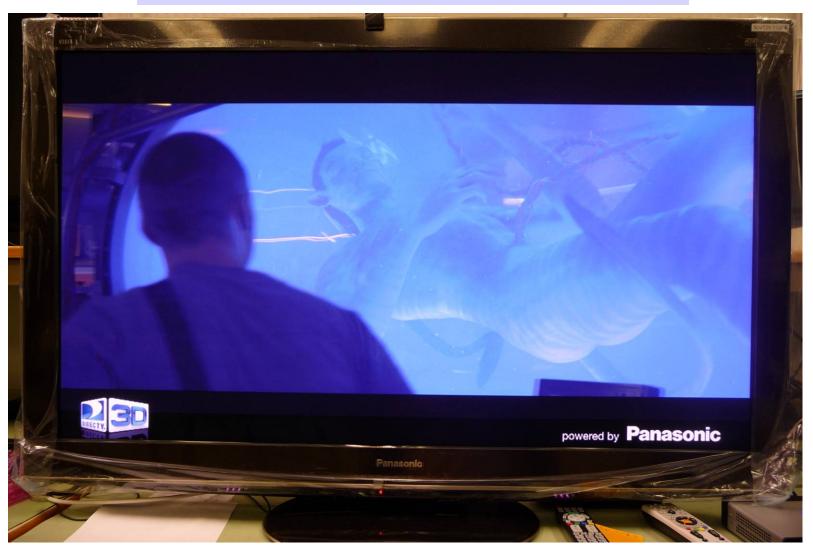
Scroll Down to the "3D input format" option

How to change from 2D to 3D

Change it from "Auto" to "Side by Side"

How to change from 2D to 3D

The picture should like the figure below

How to change from 2D to 3D

Change it from "Auto" to "Top and bottom"

How to change from 2D to 3D

The picture should like the figure below

How to change from 2D to 3D

Then press the "EXIT" button on the remote

Connections

USB Ports

USB Ports (2)

It is not warranted that all USB devices will work with this unit.

It allows playback for photos, video clips, and music clips.

It does not read hard drives.

It reads thumb drives.

It does not support USB device charging.

FAT12, FAT16 and FAT32 file systems are supported.

This unit supports USB 2.0 High Speed.

Using the **USB ports**, the TV is also **WiFi-ready**, but you need to purchase a dongle separately.

Wireless LAN Adaptor (DY-WL10)
(C5ZZZ0000048)

The Panasonic 3D plasma TVs also support DLNA.

Terminal Input	AV1 Type (Position)	RCA/S (Rear)
	AV2 Type (Position)	RCA (Side)
	Component1 Type (Position)	RCA (Rear)
	Component2 Type (Position)	RCA (Rear)
	HDMI1 Position	Rear
	HDMI2 Position	Rear
	HDMI3 Position	Rear
	HDMI4 Position	Side
	PC Input	1
Terminal Output	Digital Audio Out	Y
Network	Ethernet	1

Card I/F	SD Card Slot	Y
	SD Card LED Color	Blue
	SD Function	Movie & Photo
Other I/F	USB (Wi-Fi Ready)	2
	RS-232C	VT25 Only
Function	DLNA	-
	IPTV	Viera Cast

Internet Connection/Wireless LAN

Internet Connection

Make sure that the connection speed exceeds the following:
- At least 1.5 Mbps for SD (Standard Definition)
- 6Mbps for HD picture quality.

Note: Dial-up Internet service cannot be used for VIERA CAST.

Wireless LAN

The **DY-WL10PP-K** Panasonic wireless LAN adaptor can connect with your TV.

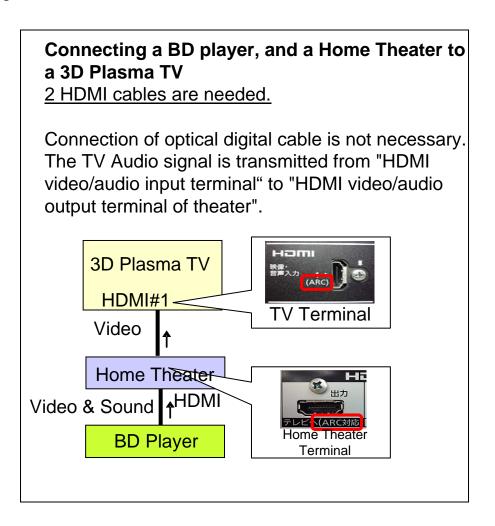**Connection with the following Access point has been confirmed for use of wireless LAN adaptor DY-WL10PP-K with your TV.**

- **NETGEAR:** WNDR3300 - WNR2000

- **Linksys:** WRT400N - WRT120N

- **D-LINK:** DIR-655

Connection

HDMI Cable
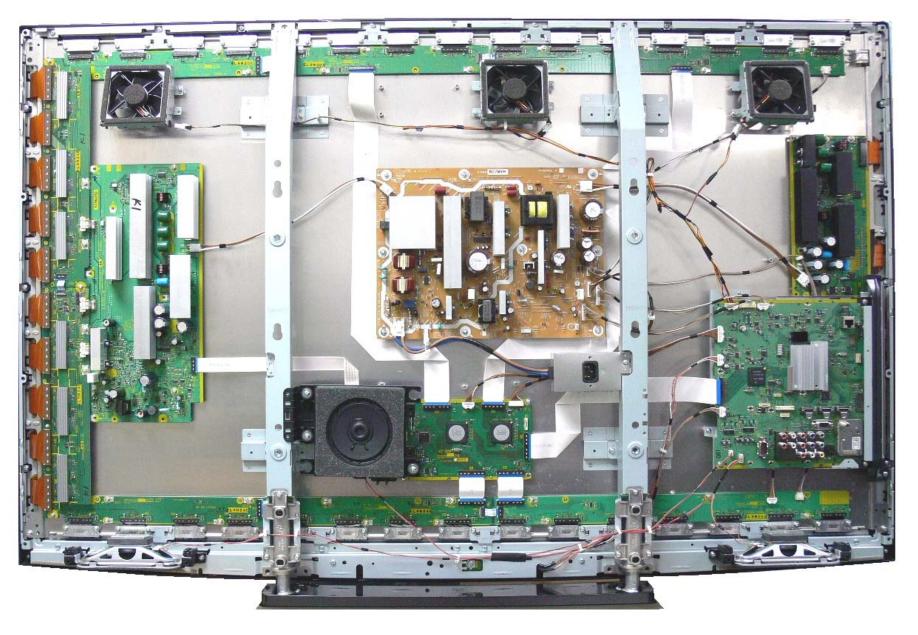
There are two types of HDMI cables: **"Standard HDMI Cable"** and **"High Speed HDMI Cable".**
Use "High Speed HDMI Cable" corresponding to FULL HD 3D.

Connecting a BD player to a 3D Plasma TV
Only a HDMI cable is needed.

Connecting a BD player, and a Home Theater to a 3D Plasma TV
2 HDMI cables are needed.

Connection of optical digital cable is not necessary. The TV Audio signal is transmitted from "HDMI video/audio input terminal" to "HDMI video/audio output terminal of theater".
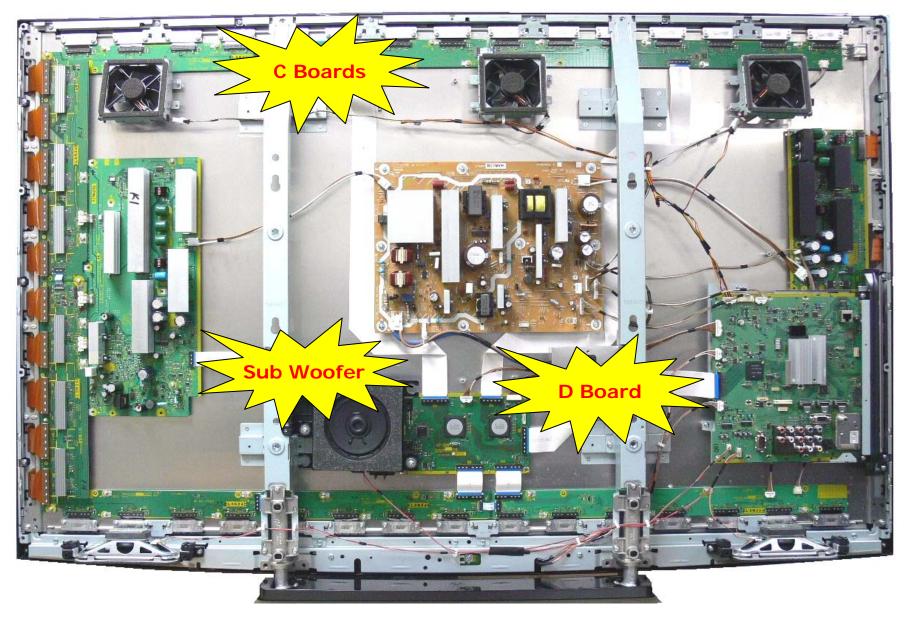
Boards Layout

TC-P50VT20

3D Model TC-P50VT20

C Boards

Sub Woofer

D Board
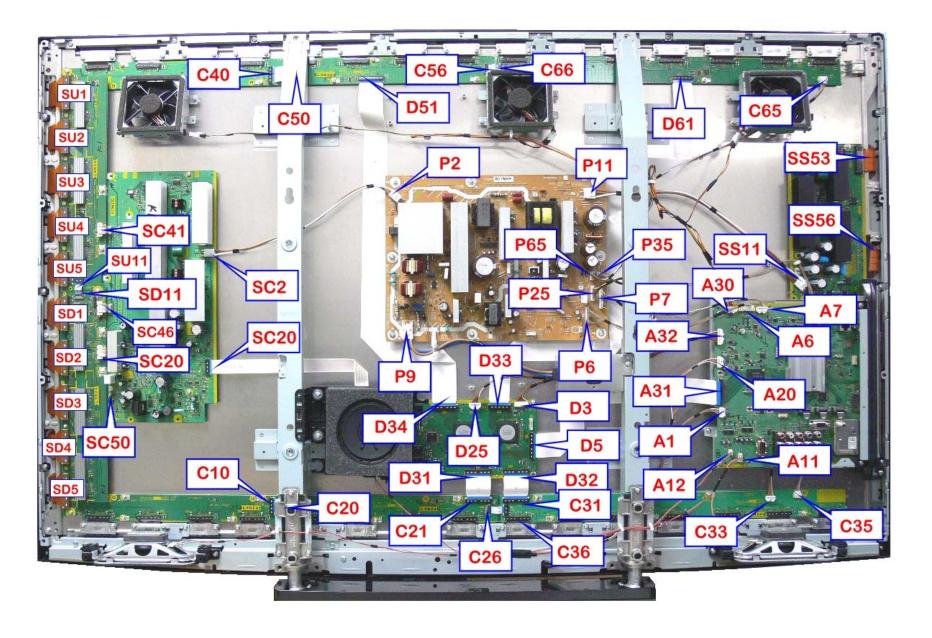
Connectors Location

Start-up Operation
Standby/Power On

Start-up Process

Upon connecting the Panasonic 3D Plasma Display Television to the AC line, the sound of relays being triggered can be heard from the Power Supply board. Also a red light from the Optical jack on the back of the TV can be observed.

Approximately 15 seconds later, the click sound from the relays can be heard again and the red LED inside the Optical jack turns off.
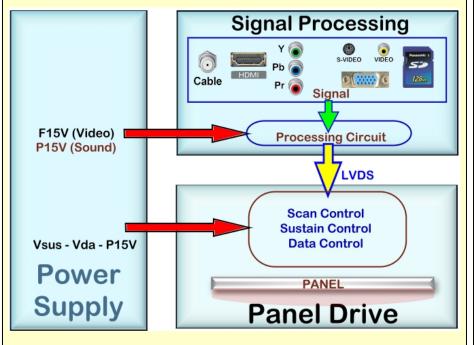
This condition is normal and by paying attention to this sequence of events, we can confirm the operation of several circuits inside the TV.
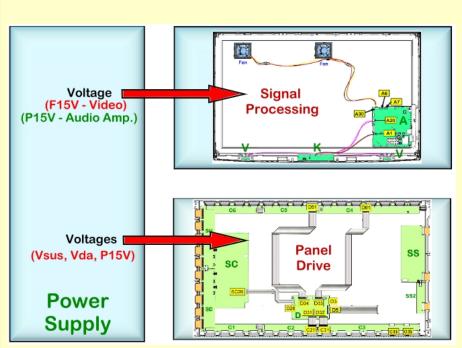
TV Start-Up Procedure

The power supply generates the voltages necessary for signal process and panel drive operations.

When the power is turned on, the power supply outputs F15V and P15V (Sound amp.) to the A board for signal processing.

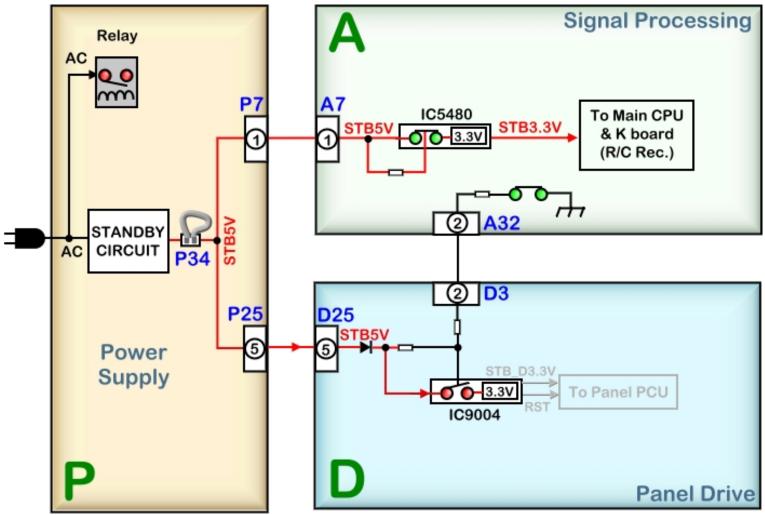Then, Vsus, Vda, and P15V are output to the panel drive section.

This is an illustration of the actual signal processing section and the panel drive section.
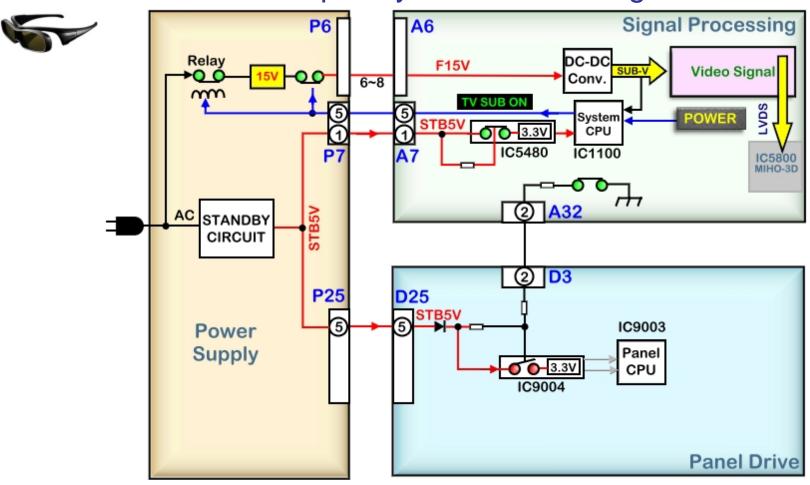
Standby Operation

The STB5V from the Power Supply is connected to the A and the D boards. During standby, this voltage is not used by the D board. In the A board, the STB5V is applied to a 3.3V regulator (IC5480) to generate the STB3.3V to power the MAIN MICON Genx8 (IC1100). The STB3.3V is also connected to the K board for remote control operation and to the power LED (Not shown here).
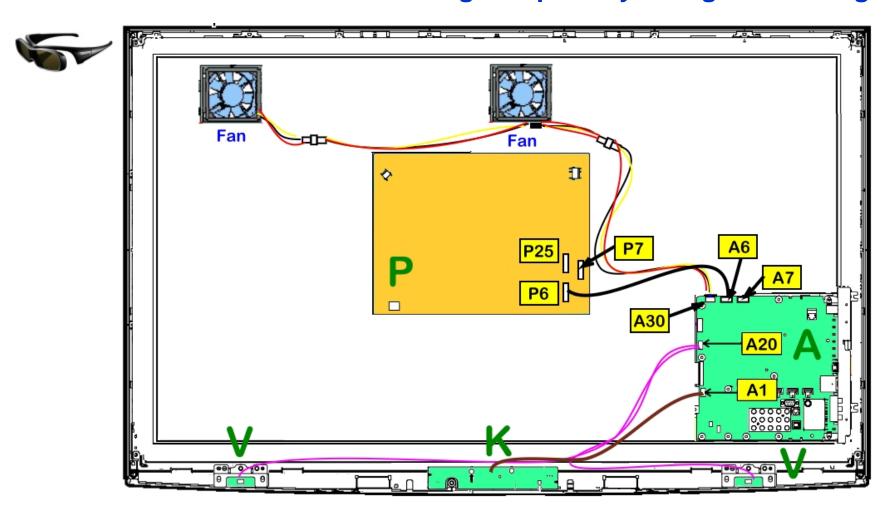
Temporary Turn On at Plug-in

When the A board receives the STB5V at pin 1 of connector A7from the power supply, it outputs the "TV_SUB_ON" command for approximately 15 seconds.

This command is applied to the power supply board to generate the F15V. The F_STB15V is applied to the A board.

The A board has a DC-DC converter circuit that generates the SUB voltages used by signal processing circuit.

Illustration of The Boards Being Temporarily Energized At Plug-in.
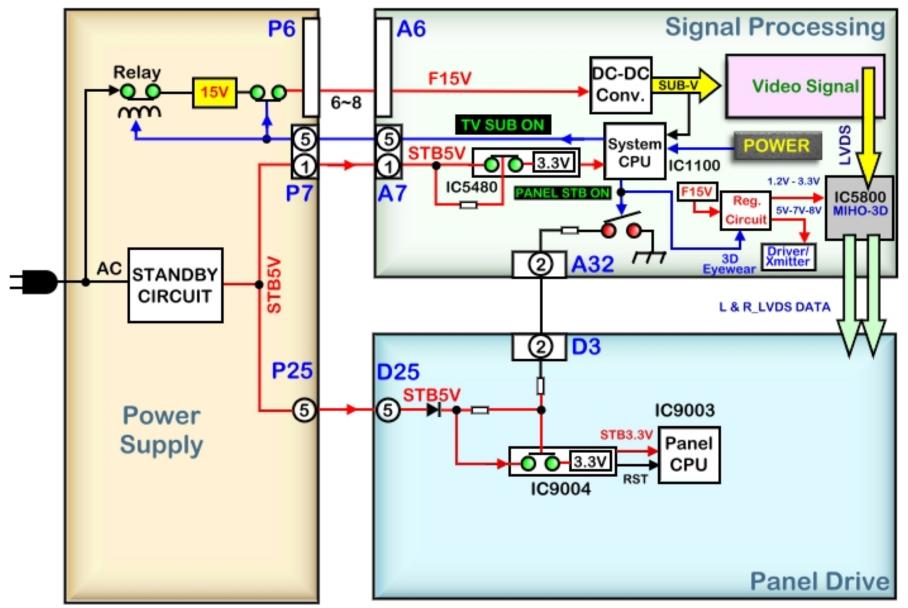

This is an illustration of the boards being temporarily energized when AC is applied to the TV.

When the TV is plugged in for the first time, the P, A, and K boards are energized for approximately 15 seconds.

Power On Operation

Power On Operation (3D Model TC-P50VT20)

The power command from the power switch on the A board or the remote control
receiver on the K board is provided to the CPU (IC1100) in the A board.

The CPU on the A board outputs 2 commands:

1. The "TV_SUB_ON" command.
2. The "PANEL_STB_ON" command.

The **"TV_SUB_ON"** (3.2V) command is provided to the power supply on pin 5 of
connector P7. The power supply outputs F15V to the A board when it receives this
command.

The F15V from pins 6~8 of connector P6 on the P board is applied to pins 6~8 of
connector A6 in the A board. This voltage is applied to a regulator circuit that
generates: SUB1.2V, SUB1.5V, SUB3.3V, SUB5V, and SUB9V. These SUB-Voltages
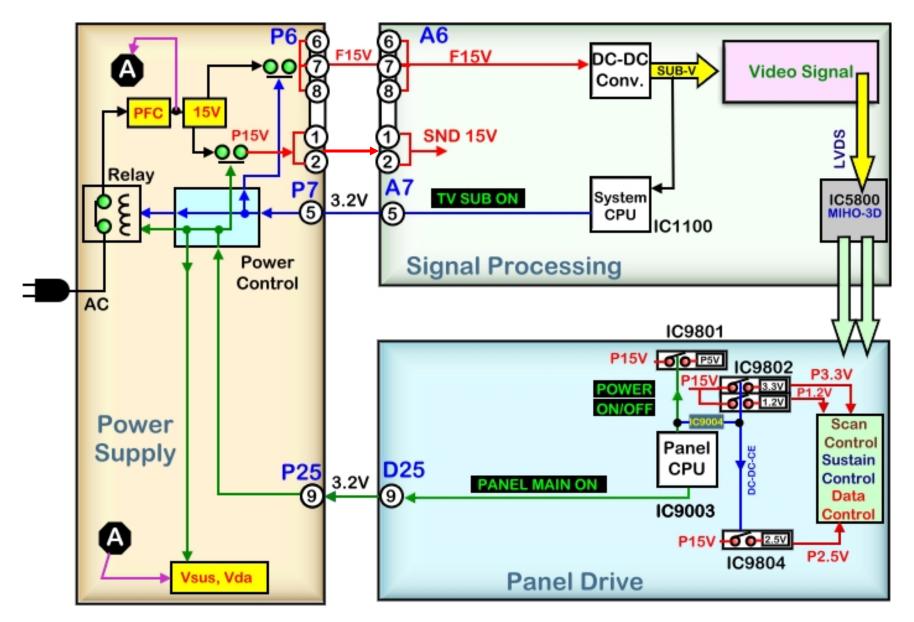are used for signal processing.

The **"PANEL_STB_ON"** (3.2V) is output from the Main CPU (IC1100) after it has
confirmed the presence of all the SUB voltages.

This command is used to turn on circuits in the both the A board and the D board.

- In the A board, it is responsible for generating the voltages used by the MIHO-3D
  (IC5800) and the 3D Eyewear Driver/Transmitter circuit.

- In the D board, it's used to turn on the 3.3V regulator (IC9400).

Power On Operation

Power On Operation

When IC9400 is turned on, it outputs the STB_D3.3V and the reset pulse to the Panel CPU (IC9003) on the D board.

When the CPU on the D board is energized, it outputs 2 commands:
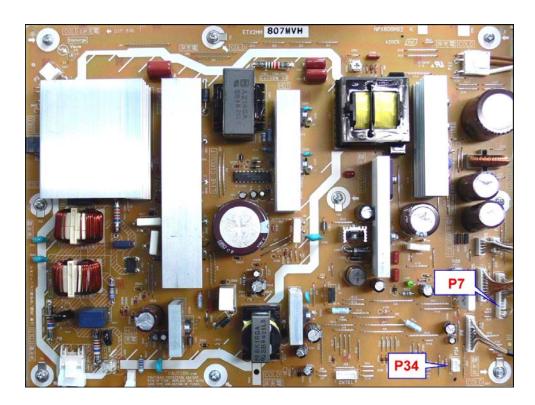
- The "PANEL_MAIN_ON"
- The "POWER ON/OFF.

The PANEL MAIN ON command turns on the power supply circuit that outputs the Vsus, Vda, 15V, and 5V.

The POWER ON/OFF command turns on the Video/Panel Control and the Discharge Control circuits in the D board.
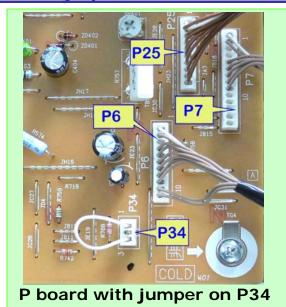
Method To Turn On the Panel Drive Circuit Only (A Board is Isolated)

Note: Before following the procedure on the next slide, make sure that connector P34 on the power supply has a jumper from pin 1 to pin 3. Some TVs may not have a jumper on P34, instead, they have a jumper between pins 12 and 14 of connector P7.

P board with jumper on P34

Power Supply

P board with jumper on P7

Method To Turn On the Panel Drive Circuit Only (A Board is Isolated)

It's possible to have the "Panel Drive Section" running with the "Signal Processing Section" (A board) disconnected.

By separating the 2 sections, it could be determined if the symptom on the TV is created by the A board or one of the boards on the Panel Drive Section.

Note: Disconnecting D3/A32 and D5/A31 allows the TV to turn on by itself with a white screen   after it is plugged in to the AC line. This procedure does not disable the A board.

To completely disable the A board:

1. Unplug the TV.

2. Remove connectors **P6** and **P7** from the power supply. (See note on previous slide.)

3. Plug in the TV (Do not press the power button).

   - The TV partially turns on by itself.

   - The screen stays black.

   - No fan operation.

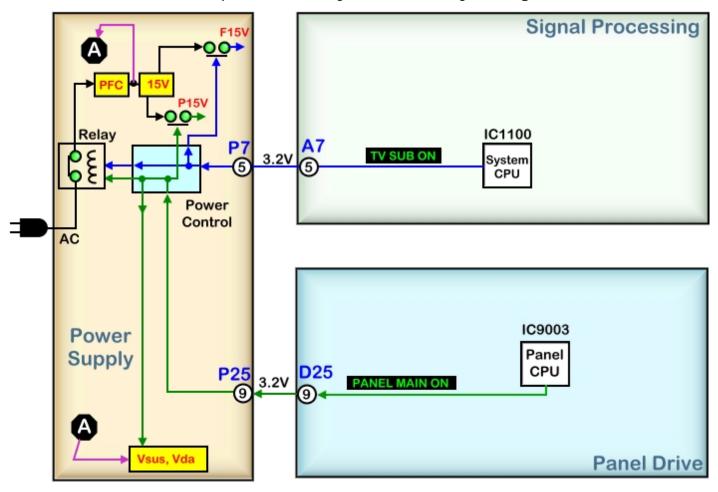   - The LEDs on the SS board and SC board are on.

To force the TV to display a white screen:

1. Unplug the TV.

2. With **P6** and **P7** disconnected, disconnect **D5** from the from the D/A board.

3. Plug in the TV.

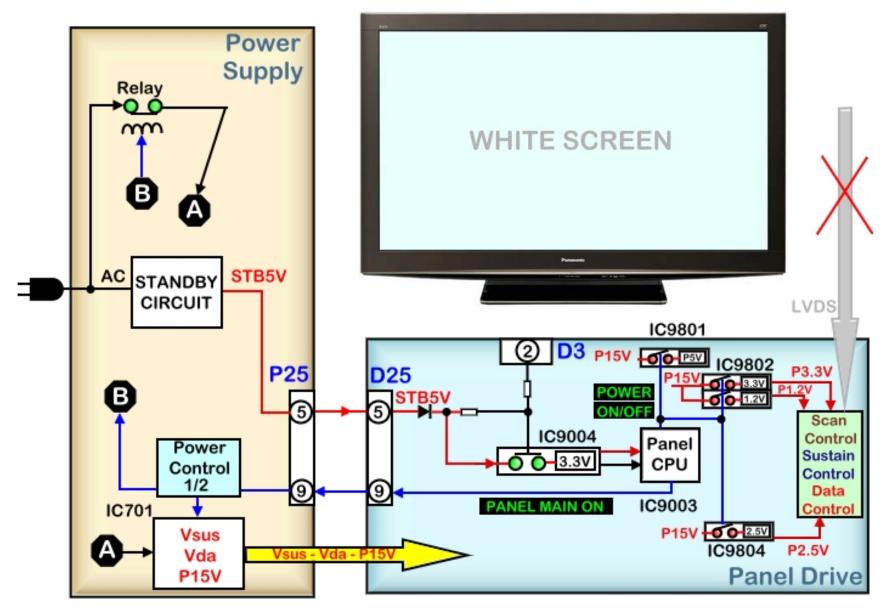4. Now the TV turns on by itself with a white screen.

Relays Triggering Commands

The AC relays in the power supply are triggered when the TV-SUB-ON command (3.2V) is output from the A board.

Note: The PANEL-MAIN-ON command (3.2V) from the D board can also trigger the relays, but since it's preceded by TV-SUB-ON, it has not effect on the relays because by the time this command is output, the relays are already energized.
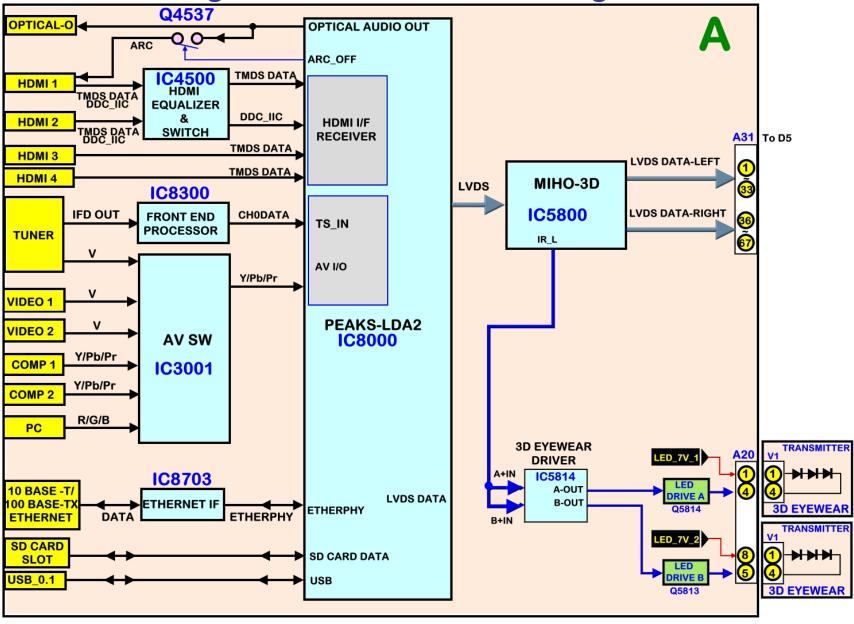
Method To Turn On the Panel Drive Circuit Only (A Board is Isolated)

Slide 65

Signal Processing

Signal Process Block Diagram

Digital Signal Processor Explanation

The main function of the A board is to select and process one of the incoming video signals. Analog signal from Video inputs 1 and 2, Component Inputs 1 and 2, PC input, and the composite video output of the tuner are all connected to IC3001 for selection. The video output signal, (Y, Pb, Pr) enters the PEAKS LDA2 IC (IC8000) for processing.

The digital signal from the 4 HDMI ports is also provided to IC8000. Only HDMI is ARC (Audio Return Channel) compatible.
The data from HDMI 1 and HDMI2 are connected to an Equalizer to allow for longer cables to be connected to these 2 ports.
USB data, Ethernet data, and JPEG data of the SD card are also connected to IC8000.
All picture control operations such as brightness, contrast, color, tint, etc are performed by IC8000. On Screen Display data such as channel numbers, Digital TV closed caption, and picture adjustments are mixed with the video data. The signal is then converted LVDS (Low Voltage Differential Signaling).

The LVDS data from IC8000 enters the MIHO-3D (IC5800). IC5800 separates the LVDS data into right LVDS and left LVDS and also outputs the IR synchronizing signal to the eyewear.
The Right and Left LVDS data is then output to the D board.

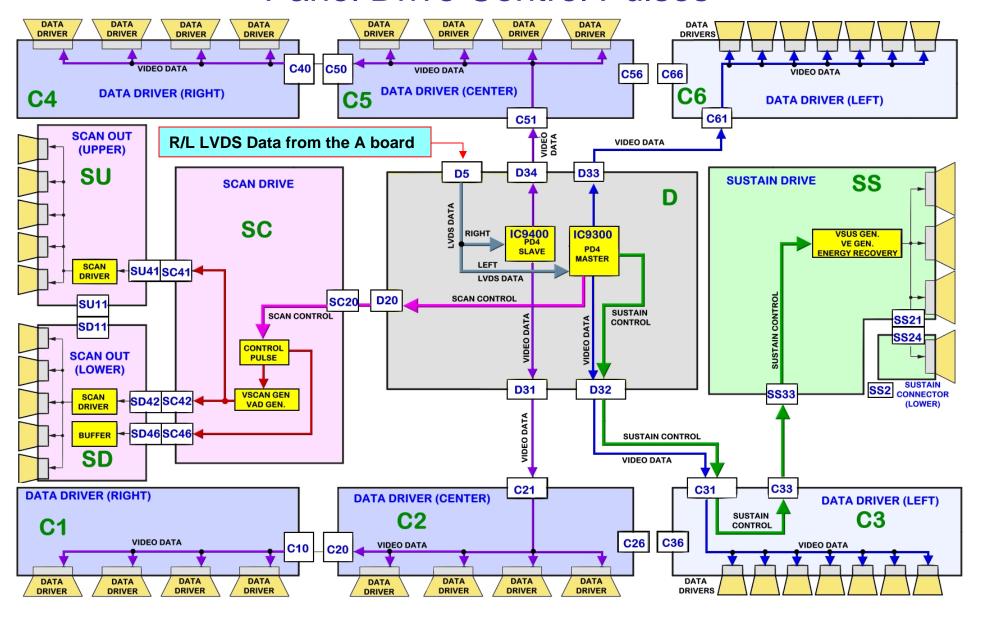# Symptom Created By a Defective A Board

This symptom is an example of a problem created by a defective A board. The Right LVDS signal from the A board is missing. The A board on previous models never caused this type of problem.

This is due to the right and left LVDS separation in the A board.

The D board normally causes this type of problem.

Panel Drive Control Pulses

Circuit Explanation

The D board consists of a Video/Panel Control circuit, a Discharge Control circuit, and a Microprocessor Control circuit.

The right LVDS (Low Voltage Differential Signaling) signal from the A board is processed by the Video/Panel Control circuit (IC9400) and the left LVDS is control by IC9300.

IC9400 output the video data to the data drive circuit boards C1, C2, C4, and C5. These boards output video data to the panel drive ICs that control the right side of the panel. The Discharge Control circuit outputs the Control Data, Sustain Data, and Scan Control Data. The Control Data is used by the Data Drive Circuit boards (C3 and C6 boards) to control the left side of the panel.

The Sustain Control Pulses are used by the Sustain board and the Scan Control Pulses are used by the Scan board.

Supply voltages P15V, P5V, and STB5V from the power supply are used to drive the circuits on the D board. Other voltages (1.2V, 2.5V, and 3.3V) derived from the P15V are used by the Video/Panel Control IC (IC9300) and the Video/Panel Control/Discharge Control IC (IC9400).

Panasonic ideas for life
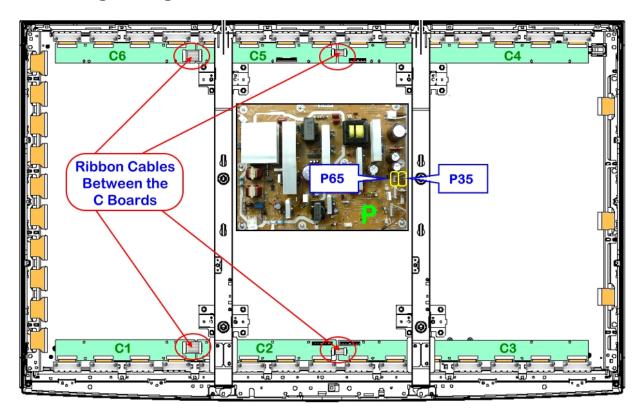
Troubleshooting Tips

Caution When Reconnecting Ribbon Cables Between C boards

It's not save to reconnect any or all the ribbon cables between the C board if the TV has been energized while they're disconnected. A residual voltage in the Vda line remains for a few minutes after the TV has been disconnected.

The panel can be damaged if there is a charge on the Vda line while the ribbon cables are been reconnected.

Warning: Before reconnecting the ribbon cables between the C boards, follow this procedure in order to prevent the panel from becoming damaged

1. **Disconnect the TV.**

2. **Remove P65(Vda) and P35(Vda) from the power Supply.**

3. **Reconnect the ribbon cables.**

4. **Reconnect P65 and P35.**

SU and SD Boards Isolation Procedure

The 2008, 2009, and 2010 plasma models are designed not to turn-on if either the SU or SD board is disconnected.

Disconnecting either causes the unit to shutdown and the power LED to blink 7 times.

Unplugging any of the connectors SC41/SU41, SU11/SD11, and SC42/SD42, opens the interlocked connection between VF_GND and CHA on the SC board. This triggers the 7 blinks SOS detect circuit shutting down the TV and making the power LED blink 7 times.
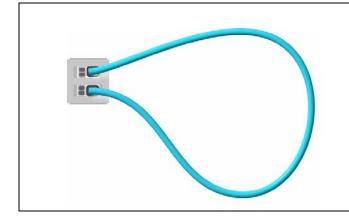
SU and SD Boards Isolation Procedure

This procedure is useful when troubleshooting 7 blinks problems.

If the power LED continues to blink even after the TV is unplugged, press and hold the power switch on the TV for a few seconds until the LED turns off.

To isolate the SM board is not necessary to remove any boards:

- ❑ Remove the 4 VF_GND screws on the SU and SD boards.
- ❑ Unplug connectors SC41, SC46, and SC42 on the SC board.
- ❑ Place the SC jig cable **(TZSC09187)** between pins 1 and 2 of connector SC50 on the SC board.

The SC test fixture (Jig) can be used when the SM board is isolated. The jig is a small connector with a jumper between pin 1 and pin 2. The part number is **TZSC09187.**
It plugs into connector SC50 on the SC board.

Note: If the SC jig is not available, install a jumper between pins 1 and 2 of connector SC50 on the SC board. (Remove the jig or the jumper after completing the isolation procedure). When this is done, the display is completely black (No picture)

SOS Detect
(Shutdown)

When an abnormality occurs in the unit, the "SOS Detect" circuit is triggered and the TV shuts down. The power LED on the front panel will flash a pattern indicating the circuit that has failed.

Cautions:

If the power LED continues to blink even after the TV is unplugged, press and hold the power switch on the TV for a few seconds until the LED turns off.

Some steps require removal of connectors and sometimes PC boards removal. Do not allow the TV to run for more than 30 seconds while connectors or boards are disconnected.

Warning: The Vsus line has large capacitors that hold the charge for some time even after the TV has been turned off and unplugged. When disconnecting P2/SC2 or P11/SS1, bleed the remaining charge of the Vsus before reconnecting the cable.

Use a 500 ohms/ 5W (At least) resistor to discharge the Vsus line before reconnecting P2/SC2 or P11/SS11.

SOS Detect Circuit

Protection circuits are incorporated in the unit to prevent the failure of a single circuit or component from creating catastrophic damage.
A shutdown condition occurs when a there is an over voltage, a short or a drop in any of the voltage lines. Also when the fans are drawing more current than normal the shutdown circuit is triggered. Normally the CPU of the D board and the CPU of the A board detect when a shutdown condition has been triggered.
When an abnormality has occurred, the unit protection circuit operates and the TV is reset to the stand-by mode. At this time, the defective block can be identified by the number of blinks of the POWER LED on the front of the unit.
IC9003 of the D board detects conditions that make the power LED blinks 2, 3, 4, 5, 6, 7, 8, or 9 times.
IC 1100 on the A board detects conditions that make the power LED blinks 10, 11, and 12 times.

Power LED Error Code Definition (1 of 2)

The following table identifies the areas where a problem is suspected according to the number of times that the POWER LED blinks.

| POWER LED ERROR CODE	CIRCUIT MONITORED	CONDITIONS TRIGGERING THE SHUTDOWN				
1 BLINLK	Panel Information SOS Panel Alarm SOS	Communication problem between the System CPU (IC1100) and the Panel CPU (IC9003)				
2 BLINKS	P15V form the P board	Missing P15V • P15V is not been generated by the P board. • P15V is been affected by one of the boards it is connected to (A short circuit of the P15V). Wrong diagnostic by the D board				
3 BLINKS	P3.3V from the D board	Missing P3.3V Reasons: • The A board is not generating the 3.3V • The 3.3V is been affected by one of the C boards or the Panel (A short circuit of the P3.3V). Wrong diagnostic by the D board				
4 BLINKS	Power Supply output voltages	Regulation issues with any of the voltages output from the power supply. Wrong diagnostic by the D board				
5 BLINKS	P5V from the A board	Missing P5V Reasons: • The A board is not generating the 5V • The 5V is been affected by the SC, SS, A, or C2 board (A short circuit of the P5V). Wrong diagnostic by the D board				
6 BLINKS	SC Energy Recovery Circuit	An increase or reduction of the Energy Recovery Circuit output (MID). Open connection between connector D20 on the D board and SC20 on the SC board. Open connection between any of the ribbon cables on the C boards and the D board. Open connection between the ribbon cable/cables interconnecting the C boards. Wrong diagnostic by the D board.				
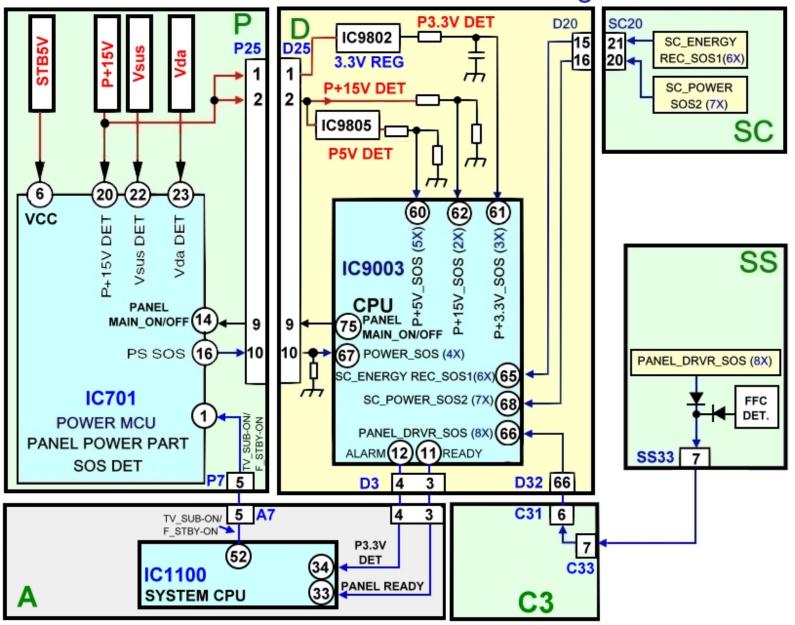
Power LED Error Code Definition (2 of 2)

| POWER LED ERROR CODE	CIRCUIT MONITORED	CONDITIONS TRIGGERING THE SHUTDOWN				
7 BLINKS	Scan Drive Circuit and Connection between the SC board and the SM board.	Missing Vsus. Abnormality of the scan circuit output, the 15V_F, the scn_pro, and Vscn circuit. Loose or open Connection between the SC board and the SM board (SC41, SC42, SC46). Open or loose connection between connectors SC2/P2 Wrong diagnostic by the D board Defective panel				
8 BLINKS	Sustain Drive Circuit and Connection between the SS board and the Panel.	Abnormality of the sustain drive circuit. Open or loose connection between the SS bd and FPCs from the panel. Open or loose connection between connectors C10/C20 Wrong diagnostic by the D board Defective panel				
9 BLINKS	Discharge Control Circuit (IC9300)	Failure of IC9300 Wrong diagnostic by the D board				
10 BLINKS		Abnormalities of the F+15V. • Reasons: • The P board is not generating the F+15V • SUB Voltages are affected by the K board or by metal object present in the SD card slot.. Shorted Vsus (By the SS board or SC board). Shorted Vda (By the panel, or any of the C board) Wrong diagnostic by the A board.				
11 Blinks	Fan SOS	Fans A board Connection and Cables between fans and A board				
12 Blinks	Sound SOS	Pinched speaker wires A board Speakers				
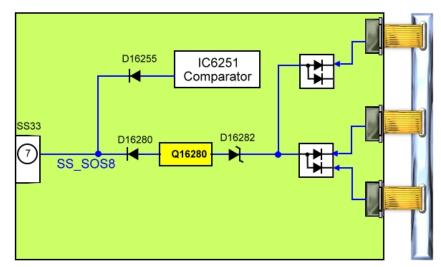
SOS Detect Circuit
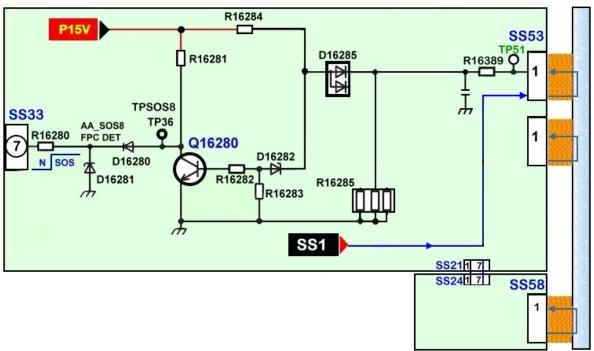
1 Blink SOS: Communication error between System CPU (IC1100) and Panel CPU (IC9003).

2 Blinks SOS: Pin 62 of the CPU IC9003 monitors the 15V line. During normal operation, the pin 62 is high. If the 15V line is missing or shorted, a low is provided to pin 62. As a result, the unit shuts down and the power LED blinks 2 times.

3 Blinks SOS: IC9802 is a 3.3V regulator located on the D board. Its output is monitored by IC9003. If the 3.3V is not present at pin 61, the MPU shuts down the unit. The power LED blinks 3 times.

4 Blinks SOS: When an over voltage condition of the voltage lines from the power supply occurs, pin 16 of IC701 goes high. This high is provided to pin 67 of IC9003 of the D board triggering the "POWER SOS" circuit. When this happens, the TV shuts down and the power LED blinks 4 times.

5 Blinks SOS: Pin 60 of the CPU IC9003 monitors the 5V line. During normal operation, the pin 69 is high. If the 5V line is missing or shorted, a low is provided to pin 60. As a result, the unit shuts down and the power LED blinks 5 times.

6 Blinks SOS: Pin 65 of the CPU IC9003 monitors the status of the SC board. During normal operation, a low is applied to pin 65. If the SC board becomes defective, a high is provided to pin 65. As a result, the unit shuts down and the power LED blinks 6 times.

7 Blinks SOS: Pin 68 of the CPU IC9003 monitors the status of the SC, SU, SD board. During normal operation, a low is applied to pin 68. If the SC, SU, or SD board becomes defective, a high is provided to pin 68. As a result, the unit shuts down and the power LED blinks 7 times.

8 Blinks SOS: Pin 66 of the MPU IC9003 monitors the status of the SS board. During normal operation, pin 7 of connector SS33 outputs a low to pin 66. If the SS board becomes defective, a high is provided to pin 66. As a result, the unit shuts down and the power LED blinks 8 times.
Another SOS Detect circuit in the Sustain board monitors for physical connection between the SS board and the panel. If any of the flex-cables from the panel is not connected or is not properly seated, a high is provided to pin 66 of the CPU in the D board. When this happened, the TV shuts down and the power LED blinks 8 times.

9 Blinks SOS: Pins 85 and 86 of the MPU IC9003 monitor the status of IC9300 and IC9400. During normal operation, pin 85 and pin 86 are low. A malfunction of IC9300 or IC9400 triggers a shutdown and the power LED blinks 9 times.

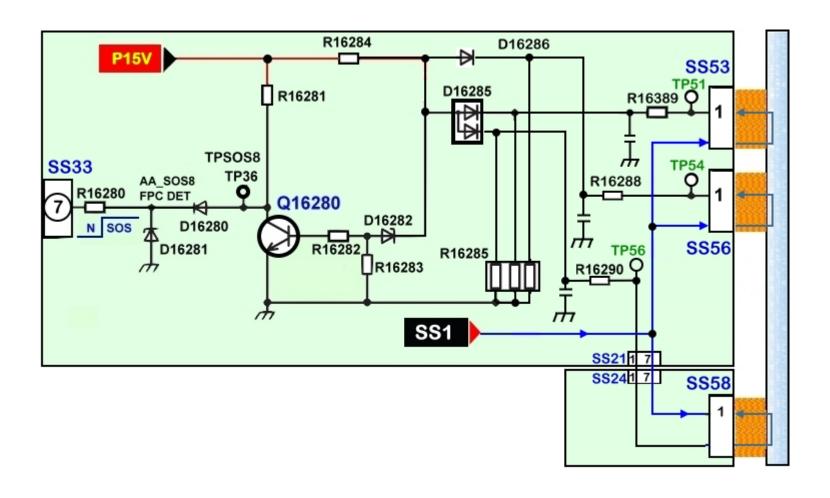# D Board SOS Detect Block Diagram

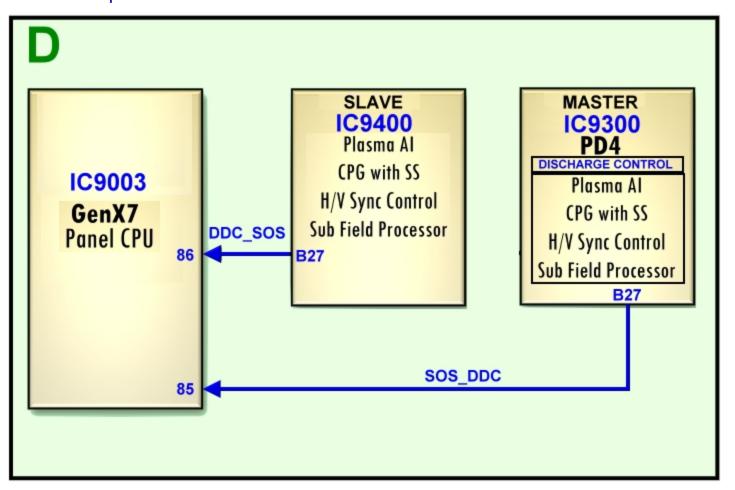# 8 Blinks Error Code

8 Blinks Error Code

9 Blinks Error Code

This condition can cause the TV to shutdown and the power LED to blink 9 times

1. <u>No communication between IC9300, IC9004 and IC9003</u>

   Since these ICs are located on the D board, only the D board can cause the TV to shutdown with 9 blinks of the power LED.
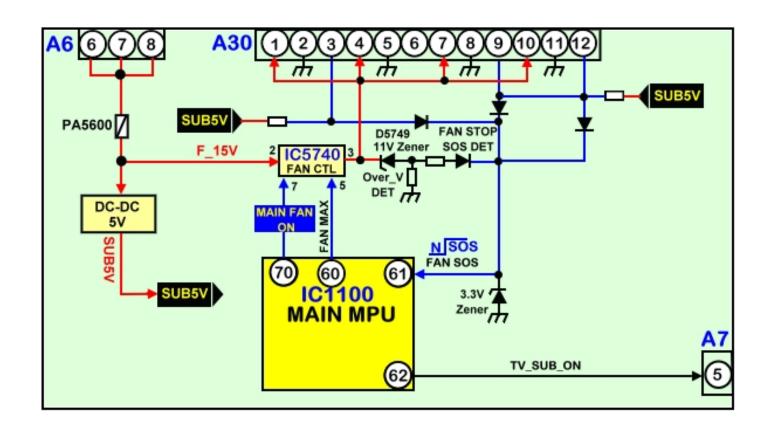
D Board SOS Detect Circuit Explanation

One of the multiple functions of IC701 (Power MICOM) is to detects abnormalities on the Power Supply. Abnormalities in the P board are reported to IC9003 via the SOS4 input:
The SOS2_15V, SOS3_3V and SOS5_5V detect input lines of IC9003, monitor for missing voltage or short circuit of the 15V, 3.3V and 5V inputs to the D board. The remaining SOS6 and SOS 7 inputs, monitor for abnormal operation of the SC and SS boards.

A defective D board may also be responsible for the 2, 3, 4, 5, 6, 7, 8, or 9 blinks of the power LED. A defective component on the D board may supply the MPU (IC9003) an erroneous input that causes the unit to shut down, with the power LED blinking a number of times.

Since the D board does not control the blinking pattern of the power LED, any detected SOS condition must be reported to the A board MPU (IC1100). The alarm pin of IC9003 reports all SOS detections to the A board MPU. The "ready" pin of IC9003 is an acknowledgement line that reports the operational status of the D board to the A board MPU.

11 Blinks Error Code (Fans)

11 Blinks Error Code Explanation
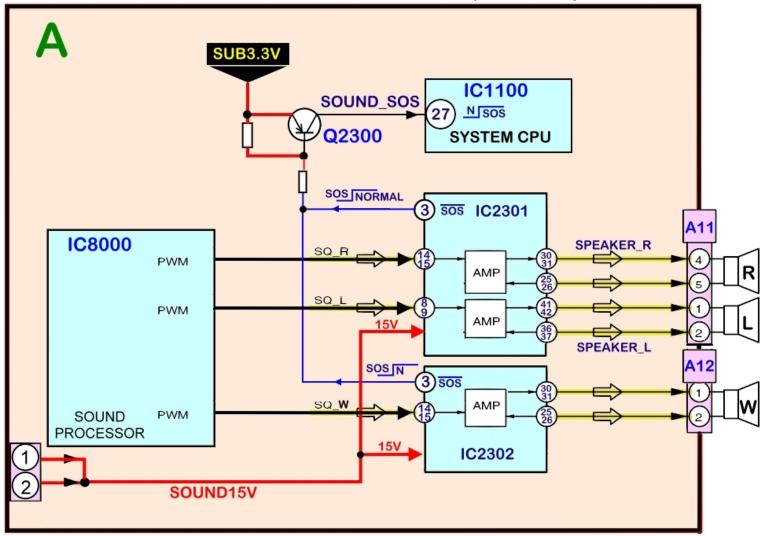
The internal temperature of the unit is monitored by the digital temperature sensor (IC9002). Variations in temperature are sensed by the IC and reported to the D board MPU (IC9003) via the SDA02 bus line. IC9003 then conveys the information to the A board MPU (IC1100) via the SDA1 bus line. Fan speed is controlled by IC9003.

The ventilation fans are monitored to be sure they are operating properly. If one of the fans opens or increases resistance, the resulting current change is applied to pin 61 of the main CPU (IC1100).

The fan drive circuit is located on the A board. To control the speed of the fan, a control voltage from the microprocessor(IC1100) is applied to IC5740.
If any of the fans is removed or becomes defective, a high is output at the corresponding pin (pin 3, 9, or 12) of the fan connector (A30) to forward bias the inline diode. The DC output of the diode is provided to pin 61 of IC1100 to trigger the SOS condition.

12 Blinks Error Code (Sound)

The transistor Q2300 monitors the speaker amplifiers ICs (IC2301 and IC2302). Pin 3 of both ICs is normally high. If any of these ICs or one of the speakers develops a short circuit, pin 3 goes low causing Q2300 to go into conduction and output a low to the base of Q2300. As a result, Q2300 comes on and outputs a high to pin 27 of the System CPU (IC1100) on the A board.

Service Notes

Service Mode

While pressing the "VOLUME **-**" button of the main unit, press the "INFO" button of the remote control three times within 2 seconds.

Service Mode Screen

SERVICE	DTVSOC SOFT	1.090	RB Cnt	000
ADJUST	DTVSOC EEP	1.01.0167		
WB-ADJ	LSI DATA	1.31.00		
OPTION	STBY SOFT	1.00.01		
VSUS	STBY EEP	01.00.0187		
AGING	PDP SOFT	02.00		
SRV-TOOL	PDPEEP	33.43		
	PDP DCC	73.03		
	PDP PDROM	33.41		
	EPOP	200		

Key command
[1] button...Main items Selection in forward direction
[2] button...Main items Selection in reverse direction
[3] button...Sub items Selection in forward direction
[4] button...Sub items Selection in reverse direction
[VOL] button...Value of sub items change in forward
direction (+), in reverse direction (-)

How to exit:

Switch off the power with the "POWER" button on the main unit or the "POWER" button on the remote control.

Self Check/Reset

1. Checks the communication IIC bus lines
2. Provides a SOS History

To Access the Self-Check Mode, turn the TV on and while pressing "VOLUME (-)" button on the main unit, press the "OK" button on the remote control for more than 3 seconds.

TV volume down & OK on remote only does a basic IC self check. It does NOT clear any unit settings.
It does not clear channel programmed settings, picture settings, channel labels, LOCK mode settings, or password.
Using this method, it shows the unit firmware version (Peaks 1.050 and GenX 1.00) and it checks IC communications ONLY.
This is more useful to identify the firmware version without having to decode the info in the setup menu About/Version screen.

To Exit the Self-Check Mode, Press and hold the Power button on the TV for 5 seconds or disconnect the AC cord from the wall outlet.

Reset Procedure

Reset forces the TV to factory shipment setting.

Note: All customer programmed parameters will be erased.

To Reset the TV, Press and hold the "VOLUME (-)"button on the TV and press the "MENU" button on the remote control for more than 3 seconds.

To Exit, Disconnect the AC cord from wall outlet.

To Exit:
Disconnect the AC cord from wall outlet.

Mirror Function

New

This feature allows the picture to be rotated 180° horizontally or 180° vertically.

When servicing plasma TVs with horizontal lines, this feature can help to determine if the A board is causing the problem or not. For vertical lines problems, this feature can help to determine if the problem is the A board or the panel. The rear cover does not have to be removed to do this.

If the position of the line/lines changes when performing this function, the A board is possibly defective. If the line/lines do not move:

❑ For horizontal lines check between the panel and the SM board.

❑ For vertical lines, change the panel.

To enter the Mirror Function.

From the Service Mode Menu, select "OPTION".

Press 3 or 4 to select "MIRROR".

Press the VOLUME up or down button to change the Mirror's data.

Data = 00 is the default data (Mirror feature is off)
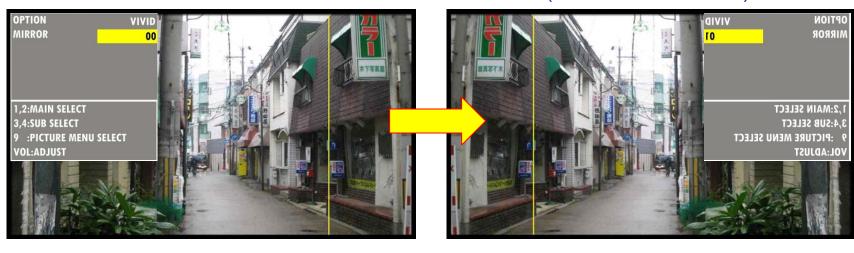
Data = 01 The picture is flipped 180° horizontally.

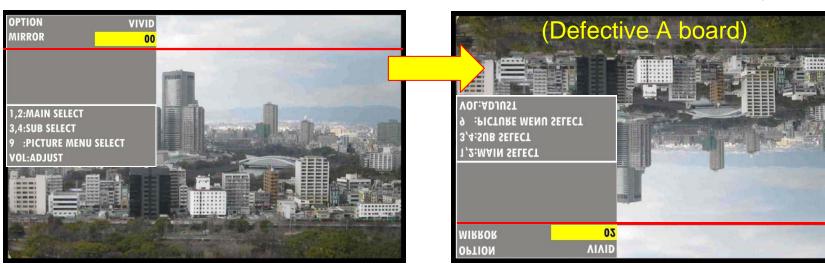Data = 02 The picture is flipped 180° vertically

Mirror Function

Normal View

Picture flipped Horizontally
(Defective A board)
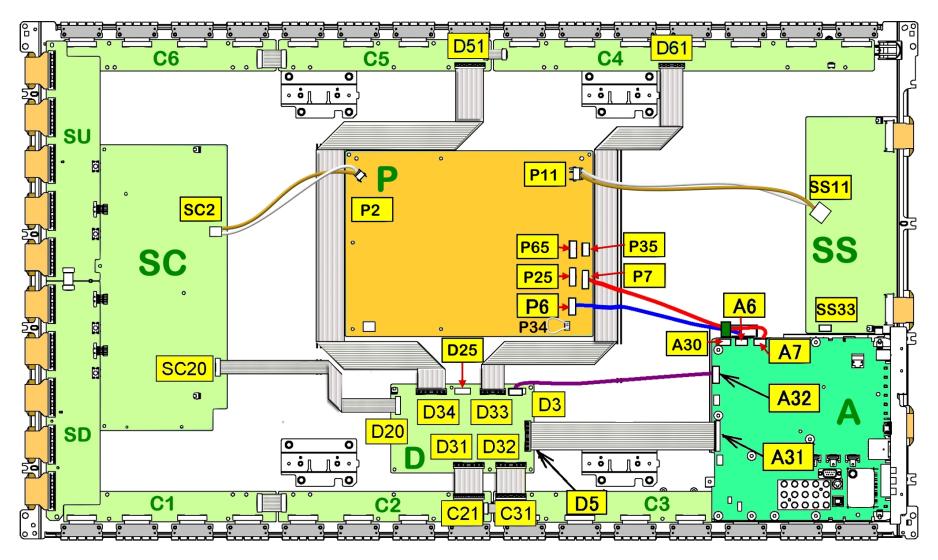
Normal View

Picture flipped Vertically

(Defective A board)

TC-P50VT20

TV's Behavior After Connectors Removal

MODEL N0. TC-P50VT20 (Connectors Removal on the D Board)							
Connectors							Result
D31							TV stays ON with black bottom right quadrant
	D32						SOS 6 Blinks
		D33					SOS 6 Blinks
			D34				TV stays ON with black top right quadrant
				D20			SOS 6 Blinks
					D5		White screen when powered on.
						D3	TV turns on by itself at plug-in with black screen, No fans, SC & SS LEDs are ON.
							D25	SOS 1 Blink
					D5	D3	TV turns on by itself at plug-in with white screen and no fan operation **Note:** *The A board is not completely isolated when these 2 connectors are unplugged.*
					D5	D3	D25	SOS 1 Blink
D31	D32	D33	D34				SOS 6 Blinks
D31	D32	D33	D34	D20			SOS 6 Blinks

TV's Behavior After Connectors Removal

MODEL NO. TC-P50VT20 (Connectors Removal Combination on the P, A, and D Board)							
Connectors							Result
P6/A6							10 Blinks at plug-in
	P7/A7						No power (Relays click on and off continuously)
		P25/D25					SOS 1 Blink
			P35 C35				TV stays ON with black upper half of the screen
				P65 C65			TV stays ON with black lower half of the screen
					D3/A32	D5/A31	TV turns on by itself at plug-in with white screen and no fan operation
P6/A6	P7/A7						TV turns on by itself at plug-in with black screen and no fan operation. **Note:** *Unplug these connectors to isolate the A board*
P6/A6					D3/A32		TV turns on by itself at plug-in with black screen, No fans, SC & SS LEDs are ON.
P6/A6						D5/A31	10 Blinks at plug-in
P6/A6	P7/A7				D3/A32		TV turns on by itself at plug-in with white screen and no fan operation.
P6/A6	P7/A7				D3/A32	D5/A31	TV turns on by itself at plug-in with white screen and no fan operation.
P6/A6					D3/A32	D5/A31	TV turns on by itself at plug-in with white screen and no fan operation.
	P7/A7				D3/A32		TV turns on by itself at plug-in with black screen, fans running, SC & SS LEDs are ON.
	P7/A7					D5/A31	No power (Relays click on and off continuously)
	P7/A7				D3/A32	D5/A31	TV turns on by itself at plug-in with white screen and fans running.

TV's Behavior After Connectors Removal

MODEL N0. TC-P50VT20 (Connectors Removal on the SC Board)			
Connector	Connector	Connector on C1 Board	Result
SC2			SOS 7 Blinks
	SC20		SOS 6 Blinks
SC2	SC20		SOS 6 Blinks
SC2		C10	SOS 6 Blinks
	SC20	C10	SOS 8 Blinks
SC2	SC20	C10	SOS 8 Blinks

MODEL N0. TC-P50VT20 (Connectors Removal on the SS + combination of connectors removal on the SS board and SC board)				
Connector	Connector	Connector on SC Board	Connector on SC Board	Result
SS11				TV Stays On
	SS33 or C33			TV Stays On
SS11	SS33 or C33			TV Stays On
SS11		SC2		SOS 7 Blinks
	SS33 or C33	SC2		SOS 7 Blinks
SS11	SS33 or C33	SC2		SOS 7 Blinks
SS11			SC20	SOS 6 Blinks
	SS33 or C33		SC20	SOS 6 Blinks
	SS33 or C33	SC2	SC20	SOS 6 Blinks
SS11	SS33 or C33	SC2	SC20	SOS 6 Blinks

Glossary

Resolution

Resolution is a combination of values that express the quality of displayed images. A display's resolution is indicated by the number of dots in the horizontal and vertical directions of the screen, such as 1024 x 768 dots. Higher values indicate clearer, sharper image reproduction. The larger the screen size, the higher the required
resolution.

HD (high-definition) panel

The HD panel has a resolution of 1,366 x 768 pixels and an aspect ratio of 16:9. It is designed for displaying the beautiful images of digital, high-definition broadcasts.

Full HD (high-definition) panel

The term "full-HD panel" refers to 1,920 x 1,080-pixel panels that display progressive images of full-specification HDTV signals without the use of up sampling.

Number of pixels

The number of pixels indicates the resolution of the Image. The number of pixels of a digital image is expressed by the product of the number of pixels (dots) in the horizontal direction and the number of pixels (dots) in the vertical direction. The higher the number of pixels, the better the image quality. For plasma TVs and LCD TVs, the number of pixels is sometimes expressed by the following equation: number of pixels in horizontal direction x number of pixels in vertical direction x 3 (R, G, B).

Pixel

A pixel is a tiny dot that forms the smallest basic unit of a displayed image. Digital images are composed of pixels, with all of the text and images displayed on the screen consisting of dots. Digital images are usually rendered by square pixels arranged vertically and horizontally in an orderly manner.

Plasma panel

A key component of the plasma display. A plasma panel is a collection of millions of tiny fluorescent lights. By firing these lights on and off at a rapid rate, the plasma panel produces images.

Glossary

THX

THX is a trade name of a high-fidelity sound reproduction standard for movie theaters, screening rooms, home theaters, computer speakers, gaming consoles, and car audio systems. THX stands for **Tomlinson Holman's eXperiment**.

The THX system is not a recording technology, and it does not specify a sound recording format: all sound formats, whether digital (Dolby Digital, SDDS) or analog (Dolby Stereo, Ultra-Stereo), can be "shown in THX." THX is mainly a quality assurance system.

THX-certified theaters provide a high-quality, predictable playback environment to ensure that any film soundtrack mixed in THX will sound as near as possible to the intentions of the mixing engineer.

AVCHD

Advanced **V**ideo **C**odec **H**igh **D**efinition is a high-definition and standard-definition recording format for use in digital tape-less camcorders and digital cameras. It is based on the H.264/MPEG-4 AVC video compression standard. Audio is stored in compressed form (Dolby AC-3). The container format for the audio and video is MPEG transport stream.

H.264

H.264 is a standard for video compression, and is equivalent to **MPEG-4 Part 10**, or **MPEG-4 AVC** (for **Advanced Video Coding**). As of 2008, it is the latest block-oriented motion-compensation-based codec standard. The final drafting work on the first version of the standard was completed in May 2003.

The intent of the H.264/AVC project was to create a standard capable of providing good video quality at substantially lower bit rates than previous standards (e.g. half or less the bit rate of MPEG-2, H.263, or MPEG-4 Part 2), without increasing the complexity of design so much that it would be impractical or excessively expensive to implement.

YUV

YUV is used for a specific analog encoding of color information in television systems

Y' stands for the luma component (the brightness) and U and V are the chrominance (color) components.

Glossary

YUV
Is The color encoding system used for analog television worldwide (NTSC, PAL and SECAM). The YUV color space differs from RGB, which is what the camera captures and what humans view.

Composite Video and S-video
The original TV standard combined luma (Y) and both color signals (B-Y, R-Y) into one channel, which uses one cable and is known as "composite video." An option known as "S-video" or "Y/C video" keeps the luma separate from the color signals, using one cable, but with separate wires internally. S-video is a bit sharper than composite video.

Component Video
When luma and each of the color signals (B-Y and R-Y) are maintained in separate channels, it is called "component video," designated as YPbPr when in the analog domain and YCbCr when it is digital.

ASIC
An Application-Specific Integrated Circuit (ASIC) is an integrated circuit (IC) customized for a particular use, rather than intended for general-purpose use.

S/PDIF
Is a Data Link Layer protocol and a set of Physical Layer specifications for carrying digital audio signals between devices and stereo components over either optical or electrical cable. The name stands for **Sony/Philips Digital Interconnect Format** (More commonly known as **Sony Philips Digital Interface**).

DLNA (Digital Living Network Alliance)
A collaboration of the world's leading consumer electronics, PC and mobile companies, DLNA has created design guidelines for a new generation of DLNA Certified products that can work together — no matter the brand.
DLNA Certified devices today connect, discover and communicate with each other over a home network

The End